

(12) UK Patent Application (19) GB (11) 2 186 147 (13) A
(43) Application published 5 Aug 1987

(21) Application No 8602266

(22) Date of filing 30 Jan 1986

(71) Applicant
Quantel Limited

(Incorporated in United Kingdom)

Kenley House, Kenley Lane, Kenley, Surrey CR2 5YR

(72) Inventors
Peter Colin Michael
Martin Richard Trump

(74) Agent and/or Address for Service
Allan B. Logan,
Quantel Limited, Kiln Road, Shaw, Newbury, Berkshire
RG13 2HA

(51) INT CL⁴
H04N 5/66 5/74

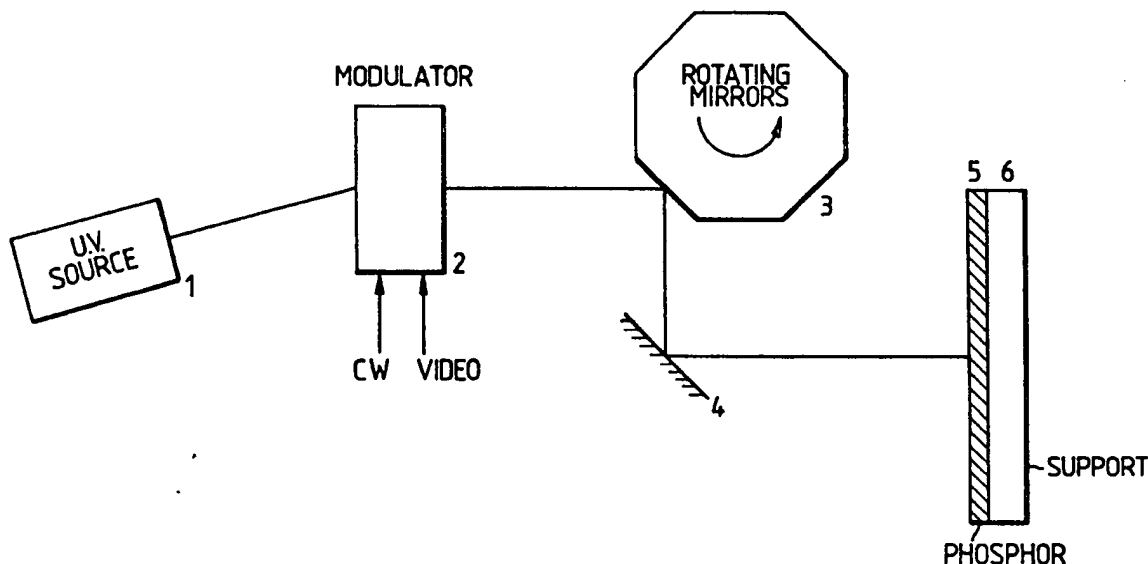
(52) Domestic classification (Edition I):
H4F CW D27A1 D27K D27R2 D27R9 D27V D42M D53M

(56) Documents cited
GB A 2118803 EP A1 0151331 US 3818129
GB 0417052

(58) Field of search
H4F
Selected US specifications from IPC sub-class H04N

(54) Image display system

(57) A beam of ultra violet light is modulated 2 in response to signals representing an image and scanned optically 3, 4 across a screen 5, 6. The screen comprises a phosphor layer 5 and a supporting layer 6 and the phosphor converts the ultra violet light to visible light so that the image may be seen. The supporting layer is opaque to ultra violet light and transparent to visible light. The light source 1 comprises an ultra violet laser and the modulator 2 an opto-acoustic modulator or a Kerr cell.

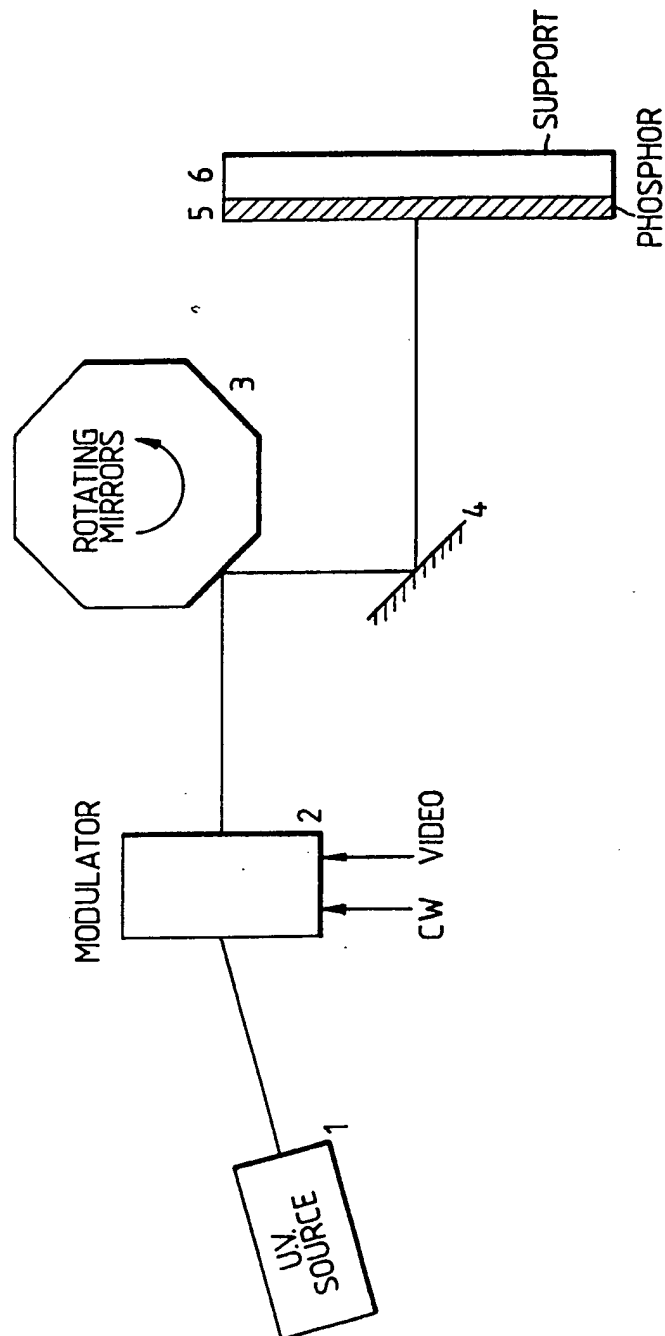


GB 2 186 147 A

30 JAN 86 02266

2186147

1/1



SPECIFICATION

Improvements in or relating to display systems

5 This invention relates to improvements in display systems.

One existing display system of the type in which a modulated beam is scanned across a screen is that used in domestic television sets but not confined to this purpose, in this example a beam of electrons is modulated in response to signals representing an image and scanned across a phosphor screen. The phosphor is excited by the beam and emits light and this enables the image to be seen. The beam is scanned over the screen in a series of horizontal lines with each line starting at a point below the start of the proceeding line and the horizontal and vertical deflection of the beam required to provide this scanning is provided electronically. The electron beam must be housed in an evacuated tube and one end is coated with phosphor to form the screen. This type of display system is well known.

Although this system is adequate for small screens the size of the screen available is limited by the size of evacuated tube that can be obtained safely. With large screens, also, the displacement of the electron beam due to environmental magnetic fields becomes unacceptable.

The object of the invention is to provide a display system which is not limited by the above factors.

According to the invention there is provided a display system comprising a source of a beam of ultra violet light, means for receiving signals representing an image, modulator means for modulating said beam of ultra violet light in response to said signals, a screen, said screen including a layer of phosphor, and means for scanning said modulated beam of light across the screen so that the beam excites the phosphor in such a way as to produce said image.

One embodiment of the invention will now be described with reference to the accompanying diagram, which is a block diagram of this embodiment.

In this embodiment a beam of ultra violet light replaces the beam of electrons scanning the screen in the prior art systems. The ultra violet light beam is not attenuated in air to the same extent as the electron beam but this beam must be energetic enough to excite the phosphors in the same way as the electrons. A suitable source of such a beam is UV laser and this is shown as Source 1 in the diagram which source provides a collimated beam of ultra violet light which passes through modulator 2. It is to be understood that there are other suitable sources.

The modulator 2 is an opto-acoustic modu-

lator which receives incoming signals representing the image and continuous wave electrical signals. A modulated CW electrical signal is produced in response to the image signals and this is applied to a transducer which causes an acoustic wave to travel through opto-acoustic material. The presence of the acoustic wave in the material causes changes in the transmission through the material for light and it is this change that produces the modulation of ultra violet light. If the material and frequency of the CW signals is chosen carefully the intensity of the beam is modulated as required with no positional change in the modulation in a pixel time. After modulation the beam strikes the surface of rotating mirror 3 which rotates so that the beam sweeps horizontally across the screen returning to the beginning of the line at the end of one sweep. The vertical deflection of the beam is provided by oscillating mirror 4. The operation of such a scanning system is well known.

After deflection by the mirrors 3 and 4 the beam strikes the surface 5 of the screen. The screen is constructed by coating a supporting layer 6 with a phosphor layer 5. The supporting layer is opaque to ultra violet but transparent to visible light so that the image may be seen without any deleterious effects to the observer due to the scattering of the ultra violet light by the phosphors. As the beam scans the screen the phosphors convert the ultra violet light to visible light in a manner determined by the modulation of the beam. This allows the observer to view on the screen the image represented by the signals input to the modulator.

The use of ultra violet light instead of an electron beam allows a larger screen to be constructed because the beam does not have to be housed in an evacuated tube as it is not so easily attenuated. The use of a large screen can still give problems such as so called pincushion distortion at the extremities of the scan but this can be overcome by modifying the linearity of the scan.

The modulator system 2 described above can be replaced by other systems, for example a Kerr cell which consists of two crossed polarisers. In this case the modulation can be provided by altering the relative angle of polarisation. This type of modulation is well known.

It is to be understood that this invention is not limited to the type of modulation and scanning described herein.

CLAIMS

1. A display system comprising:
 - a source of a beam of ultra violet light,
 - means for receiving signals representing an image,
 - modulator means for modulating said beam of ultra violet light in response to said signals,
 - a screen, said screen including a layer

of phosphor, and means for scanning said modulated beam of light across the screen so that the beam excites the phosphor in such a way as to produce said image.

- 5 2. A display system as claimed in claim 1 wherein said modulator means comprise a Kerr cell.

3. A display system as in claim 1 wherein said modulator means comprises an opto-
10 acoustic modulator.

4. A display system as in claim 1 wherein said screen includes a supporting layer said layer being opaque to ultra violet light and transparent to visible light.

- 15 5. A system as in claim 1 wherein said scanning means comprises a rotating mirror to provide horizontal scanning and a vibrating mirror to provide vertical scanning.

6. A method of displaying an image comprising;
20 providing a beam of ultra violet light, modulating said beam in response to signals representing an image, and scanning said beam across a screen containing particles that convert said ultra violet light to visible light so
25 that said image may be viewed.

7. A system substantially as described herein with respect to the diagram.